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A PERFORMANCE SURVEY OF TAPECRETE INSTALLATIONS IN ONTARIO

MATERIALS INFORMATION
ENGINEERING MATERIALS OFFICE

A PERFORMANCE SURVEY

OF

TAPECRETE INSTALLATIONS IN ONTARIO

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SUMMARY

This report summarizes the findings of a 1987 performance survey of thirteen tapecrete installations in Ontario. These installations were all treatments on structural barrier walls and the majority contained fibre reinforcement.

In general, the tapecrete with fibre mesh reinforcement is performing well with respect to scaling resistance and bond. Corrosion of the underlying steel is evident as rust spots have developed on the surface of some of the treatments.

The tapecrete without the fibre is not performing as well. In places, most notably around full-depth cracks, there is a loss of bond and the tapecrete has peeled off.

It is recommended that tapecrete should only be used with fibre mesh reinforcement and should be carried over the top of barrier walls. Where there is low cover to uncoated steel and surface restoration is not required, treatment with a penetrating sealant should be considered in lieu of tapecrete.

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INTRODUCTION

Over the past ten years, tapecrete has been recommended for use on structure barrier walls with insufficient cover or, in some cases, lack of entrained air. The purpose of this treatment is to try to extend the life of the wall by retarding the penetration of chlorides.

In most cases where tapecrete has been used, the treatment has consisted of a layer of fibre reinforcement surrounded by two layers of latex modified grout. Application of two layers of grout without the fibre has also been tried.

OBJECTIVES

The objectives of this survey were as follows:

1. to examine and evaluate the performance of tapecrete placed to date;

2. to evaluate the merits of the fibre reinforcement; and

3. to provide input for design recommendations.

OBSERVATIONS

The specific details of the installations surveyed are contained in Appendix A. The following are general observations of all sites:

1. The overall appearance and bond of the tapecrete with fibre reinforcement is good with little or no sign of scaling or spalling. The only exceptions were Duffin's Creek and Lynde's Creek where tapecrete was used on the front face of the walls only. These walls have deteriorated badly, with substantial spalling along the top of the walls and heavy corrosion of the underlying steel.

2. Some small rust spots can be seen on the surface of some treatments indicating corrosion of the reinforcing steel.

3. The tapecrete without the fibre mesh has not performed as well as the tapecrete with fibre. The treatment has been disbonded and peeled off in places, most notably around full-depth cracks.

4. Plow damage such as scrapes and gouges are evident on all the walls exposed to it.

5. Discolouration from water is noticeable around full-depth cracks.

CONCLUSIONS

Cracking and surface gouges in combination with water caused tapecrete without fibre reinforcement to separate from the concrete and peel off. The fibres seem to prevent this and keep the treatment virtually intact.

The poor performance of the barrier walls at Duffin's and Lynde's Creek indicate that the treatment should be carried over the top of the wall. This will prevent moisture penetrating under the treatment.

The treatment has generally performed well but does not appear to be totally effective in stopping the rusting of uncoated steel. The appearance of the fibre reinforced tapecrete is good. The reinforced tapecrete seems to prevent or at least slow down spalling or scaling.

RECOMMENDATIONS

1. Tapecrete should only be used with fibre mesh reinforcement.

2. The treatment should be carried over the top of the wall.

3. In cases where there is low cover to uncoated steel and surface restoration is not required, treatment with a penetrating sealant should be considered, in lieu of tapecrete.

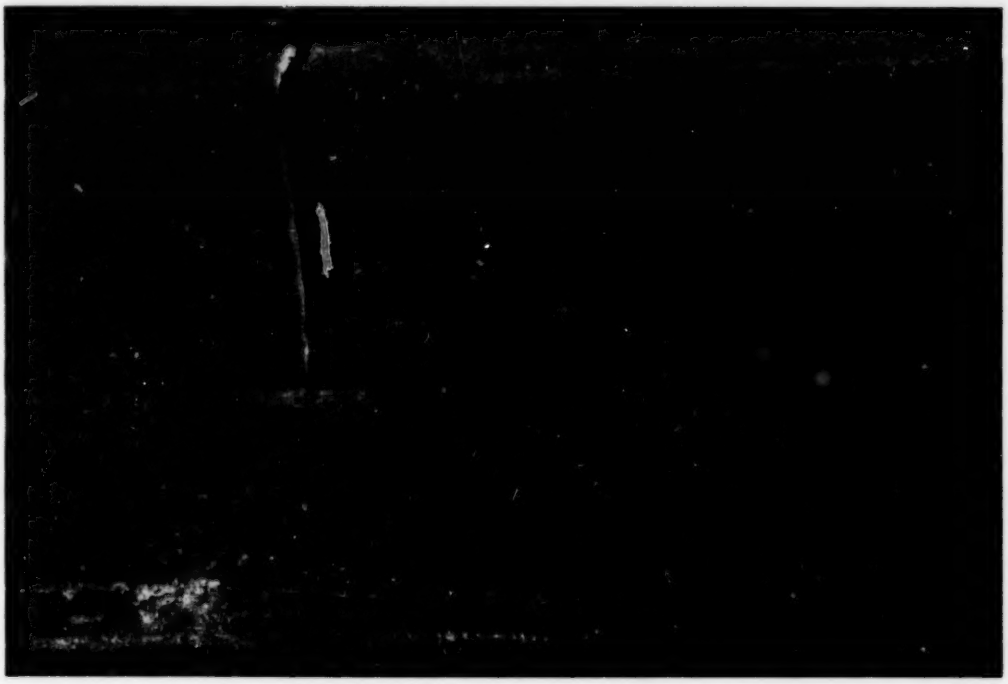
APPENDIX A

SPECIFICS OF TAPECRETE INSTALLATIONS

Location: Omeemee
Highway: Hwy. 7, 4 km east of Omeemee
Placed: 1980
Contract: 79-10465
Type: With fibre mesh

Details of Placement:

- Tapecrete on top and face of barrier wall and also on the sidewalk and curb.



Observations:

- appearance and bond excellent
- no sign of rust
- plow damage on the curb

Location: Buckhorn
Highway: Hwy. 507 two structures - Trent Canal
- Lower Buckhorn Lake
Placed: 1980
Contract: 79-10465
Type: With fibre mesh

Details of Placement:

- Tapecrete on top and face of barrier wall.

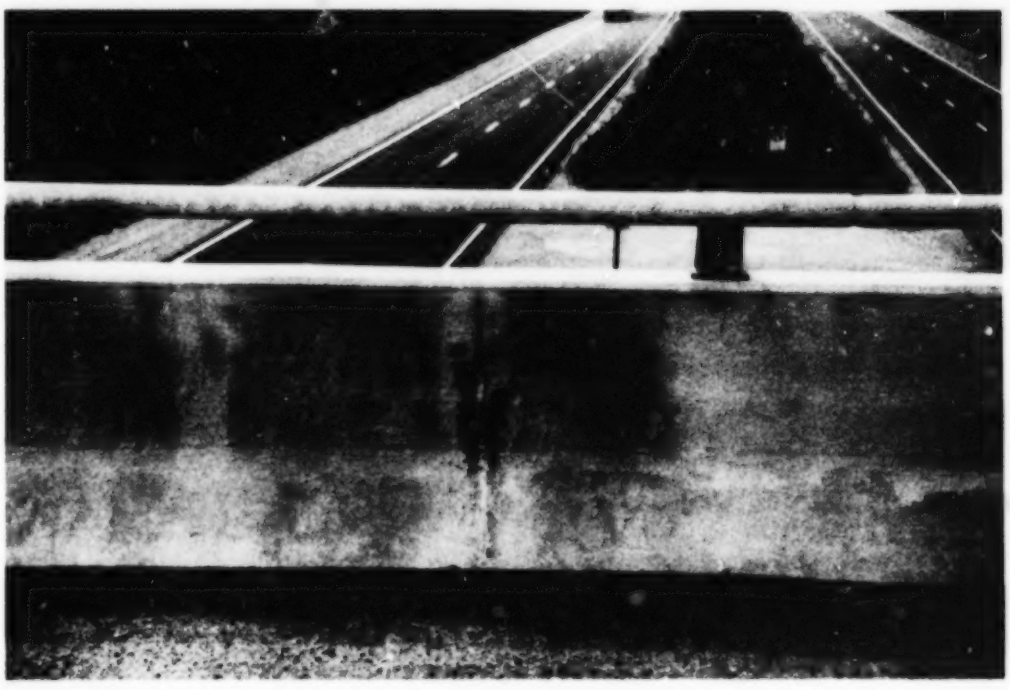
Observations:

- overall appearance and bond excellent
- some limited loss of bond in small areas i.e. 6 inch circle
- a few small spots of rust
- some discolouration around full-depth cracks but no loss of bond

Location: St. Catharines
Highway: 3rd Ave. over Hwy. 406
Placed: 1983
Type: With fibre mesh

Details of Placement:

- 6 panels on the south barrier wall, Tapecrete on top and the vertical face of the barrier wall (not on the sloping bottom face).



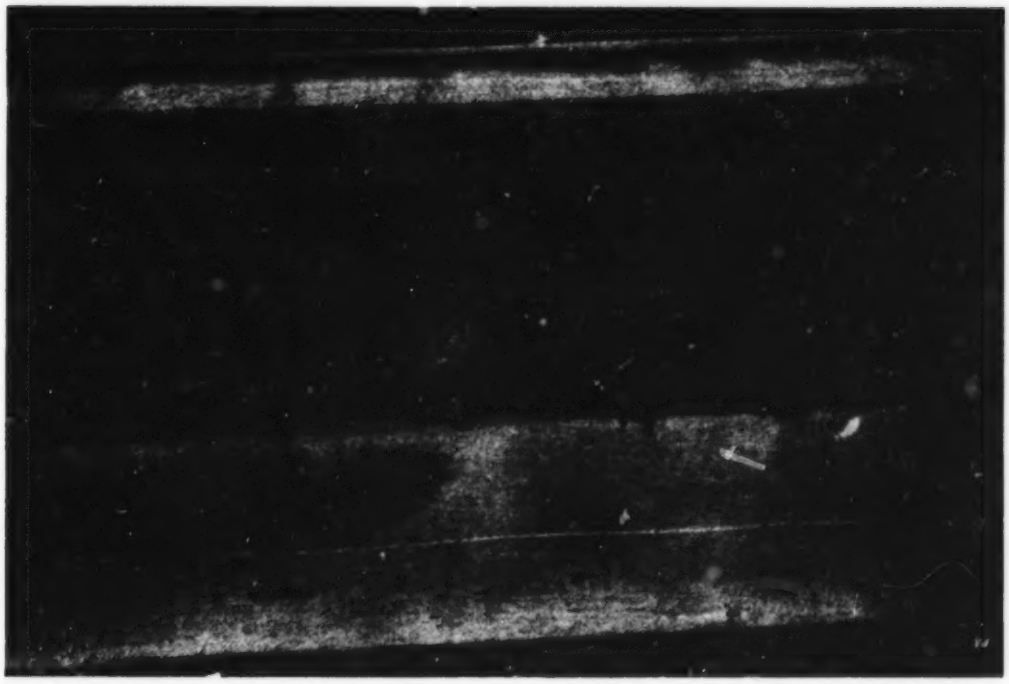
Observations:

- appearance and bond excellent
- no sign of rust
- some discolouration around full-depth cracks but no loss of bond

Location: Toronto
Highway: Hwy. 427 two structures - over Hwy. 409
- next structure south
Placed: 1978
Contract: 77-46
Type: With fibre mesh

Details of Placement:

- Tapecrete on top and face of barrier wall.



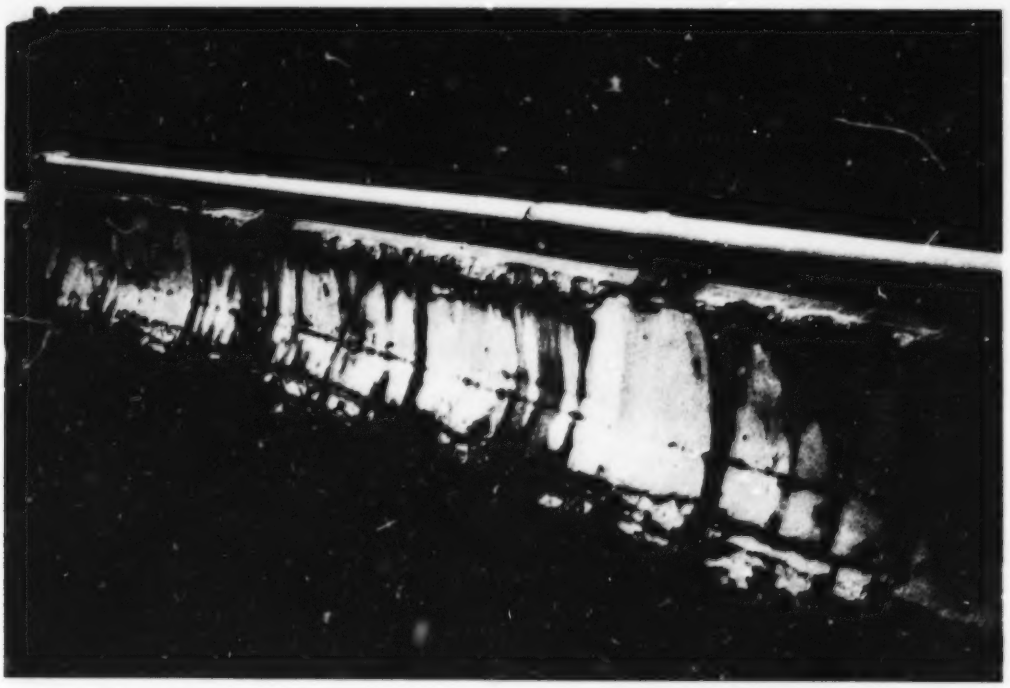
Observations:

- overall appearance and bond excellent
- some limited loss of bond
- significant plow damage to bottom half, scrapes and some strips removed
- some small spots of rust

Location: Ajax
Highway: Hwy. 401 two locations - Duffin's Ck.
- Lynde Ck.
Placed: 1976
Contract: 75-07
Type: With fibre mesh

Details of Placement:

- Tapecrete on top and face of barrier wall only, not on the top.



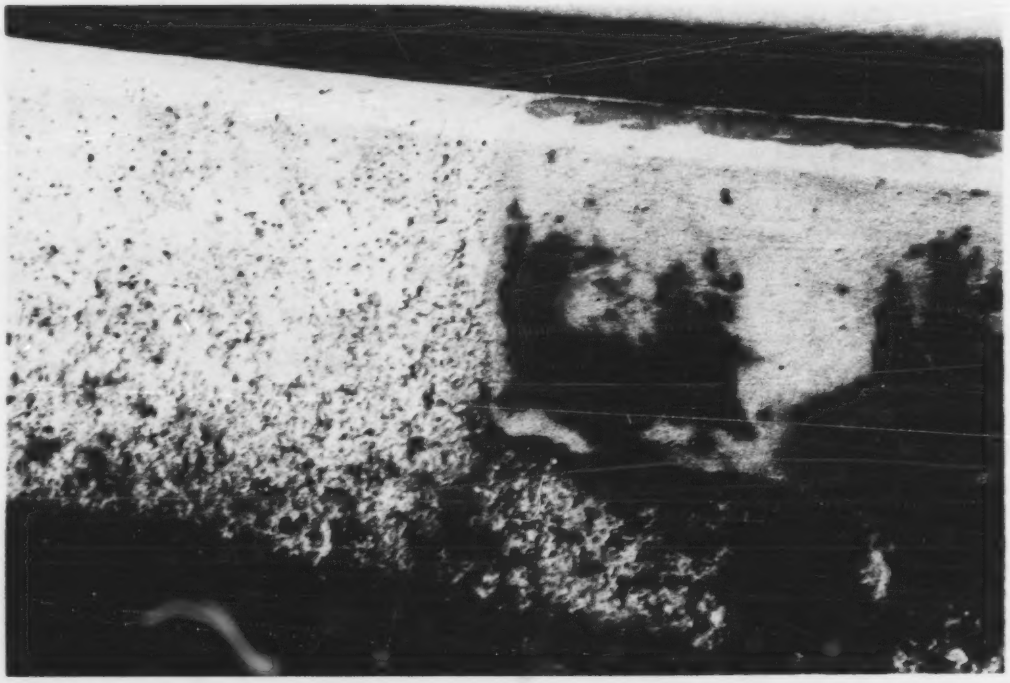
Observations:

- severe spalling of the concrete at the top of the barrier wall
- heavy rusting of the top steel
- snow plow damage evident
- numerous cracks and heavily discoloured areas

Location: Caledonia
Highway: Hwy. 6 over Grand River (Caledonia By-pass)
Placed: 1982
Type: With fibre mesh

Details of Placement:

- Tapecrete on the top and vertical face of barrier wall only (not on the sloping bottom face)
- not on the entire structure



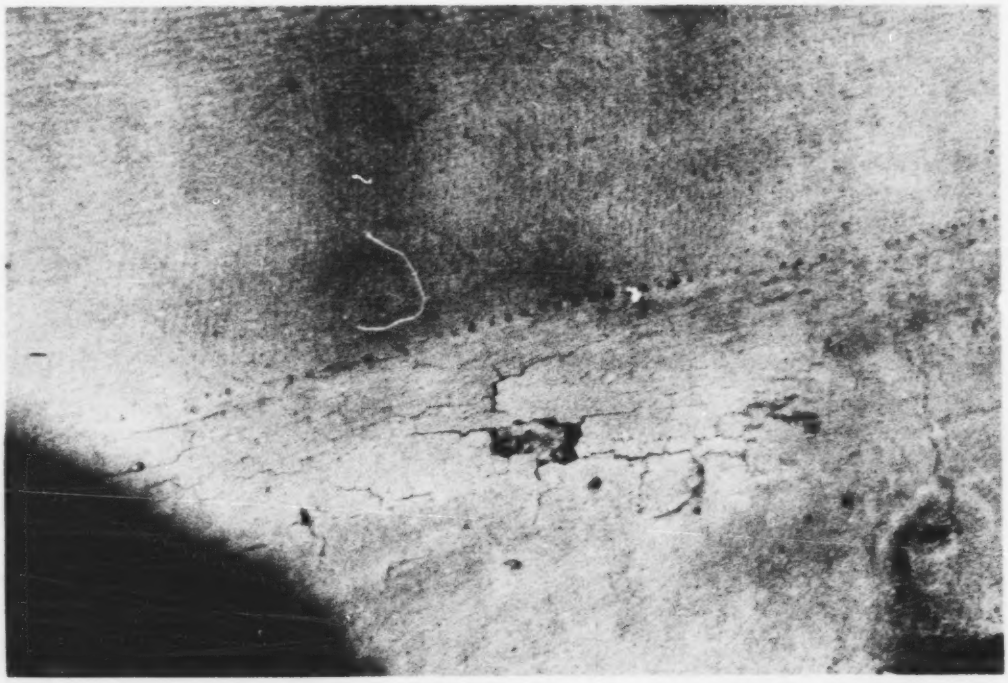
Observations:

- appearance and bond excellent
- no sign of rust
- the concrete without tapecrete has scaled

Location: Aurora
Highway: Hwy. 404 and Aurora Rd.
Placed: 1984
Contract: 82-74
Type: With fibre mesh with a small area done without mesh.

Details of Placement:

- Tapecrete on the top and face of barrier wall (the mesh does not in all places extend to the bottom of the wall).



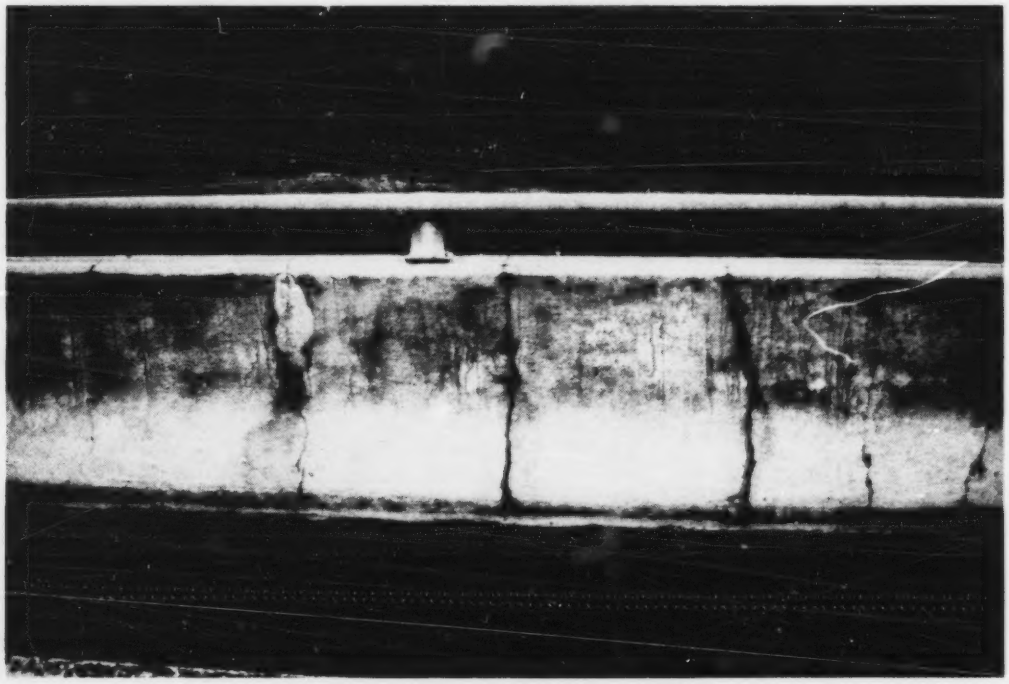
Observations:

- appearance and bond of the Tapecrete with fibre mesh excellent
- the Tapecrete without the mesh is peeling away in places
- no sign of rust

Location: Denbigh
Highway: 28 Snake River Bridge, west of Denbigh
Placed: 1985
Contract: 82-17
Type: Without fibre mesh

Details of Placement:

- Tapecrete on the top and face of barrier wall.



Observations:

- the Tapecrete is peeling away in places mainly where full depth cracking of the concrete has occured
- discolouration around the cracks
- no sign of rust

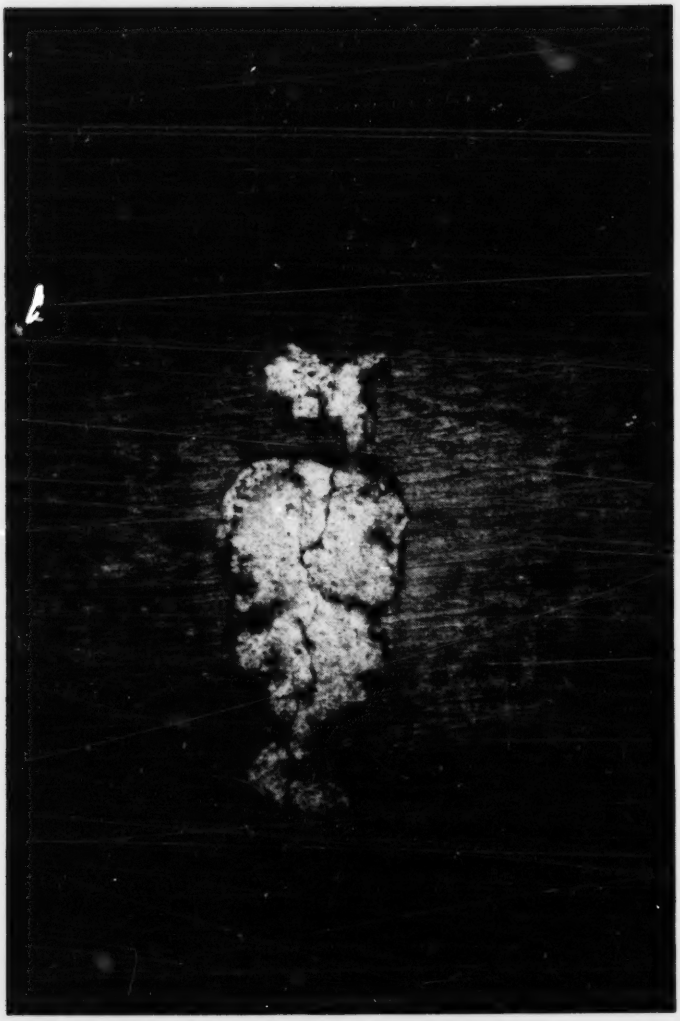
Location: Madawaska River
Highway: Hwy. 515 Latchford Bridge, east of Hwy 514
Placed: 1984
Contract: 82-12
Type: Without fibre mesh

Details of Placement:

- Tapecrete on the top and face of barrier wall.

Observations:

- the Tapecrete is peeling away in places, mainly where full-depth cracking of the concrete has occurred
- discolouration around the cracks
- no sign of rust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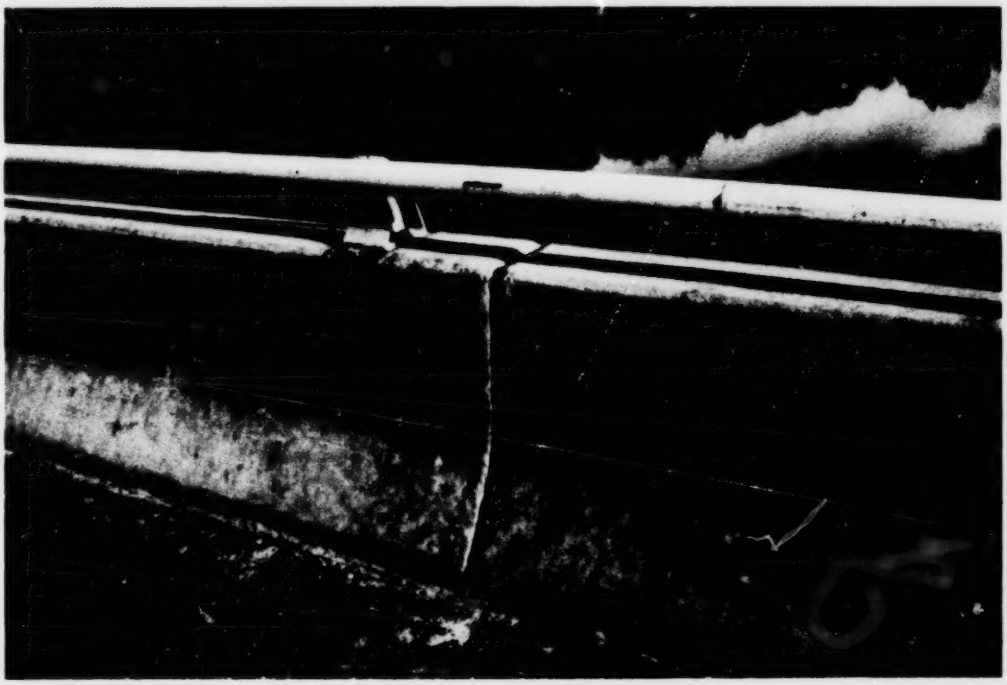
Location: Casselman
Highway: Hwy. 417 South Nation Bridge, west of Casselman
Placed: 1985
Contract: 84-68
Type: With fibre mesh

Details of Placement:

- Tapecrete on top and face of barrier wall on the south side of the east bound lane.



Observations:

- appearance and bond excellent
- no sign of rust
- some plow damage